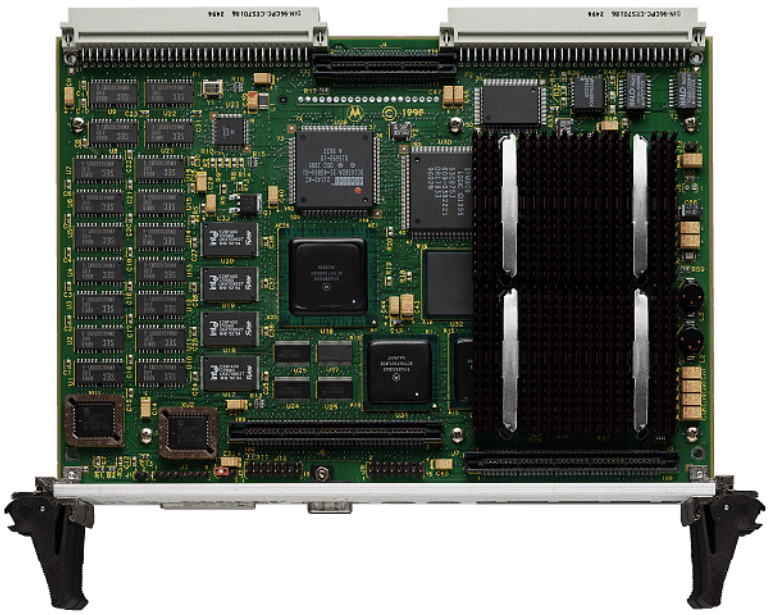
MVME3600 and MVME4600

VME Processor Modules



Processor Memory Module

- Single or dual PowerPC 604™ processors
- 512K lookaside L2 cache
- 64MB on-board ECC DRAM—up to 1GB with optional RAM201 memory expansion modules
- 8MB on-board Flash, 1MB socketed
- Secondary Ethernet and SCSI interfaces
- 64-bit PCI mezzanine connector
- On-board debug monitor with self-test diagnostics

Base I/O Module

- IEEE P1386.1 compatible 32/64-bit PMC expansion slot
- 2 or 3 async, 1 or 2 sync/async serial ports
- Ethernet and SCSI interfaces
- SVGA graphics with 2MB video memory
- Parallel, floppy, keyboard and mouse interfaces
- 8KB x 8 NVRAM and time-of-day clock with replaceable battery backup
- Four 32-bit timers, one watchdog timer

Scalable high-performance VME computing with the flexibility of PMC expansion

The flexibility of the MVME3600 and MVME4600 provides an excellent base platform that can be quickly and easily customized for a variety of industry-specific applications.

Designed to meet the needs of military and aerospace and industrial automation applications, MVME3600 and MVME4600 VMEbus board-level computers consist of a processor-memory module and a base I/O module, both 6U, assembled to form a single two-slot brick. This modular structure allows the processor module to be upgraded (including sufficient space for multiprocessor implementations) and provides the physical space for an increased range of networking and mass storage expansion interfaces. DRAM expansion mezzanines enable memory upgrades to the maximum 1GB of ECC DRAM without requiring additional VME slots.

The tightly coupled multiprocessor configuration of the dual processor MVME4600 provides additional computing power for the most demanding tasks, including simulation and database or matrix manipulation.

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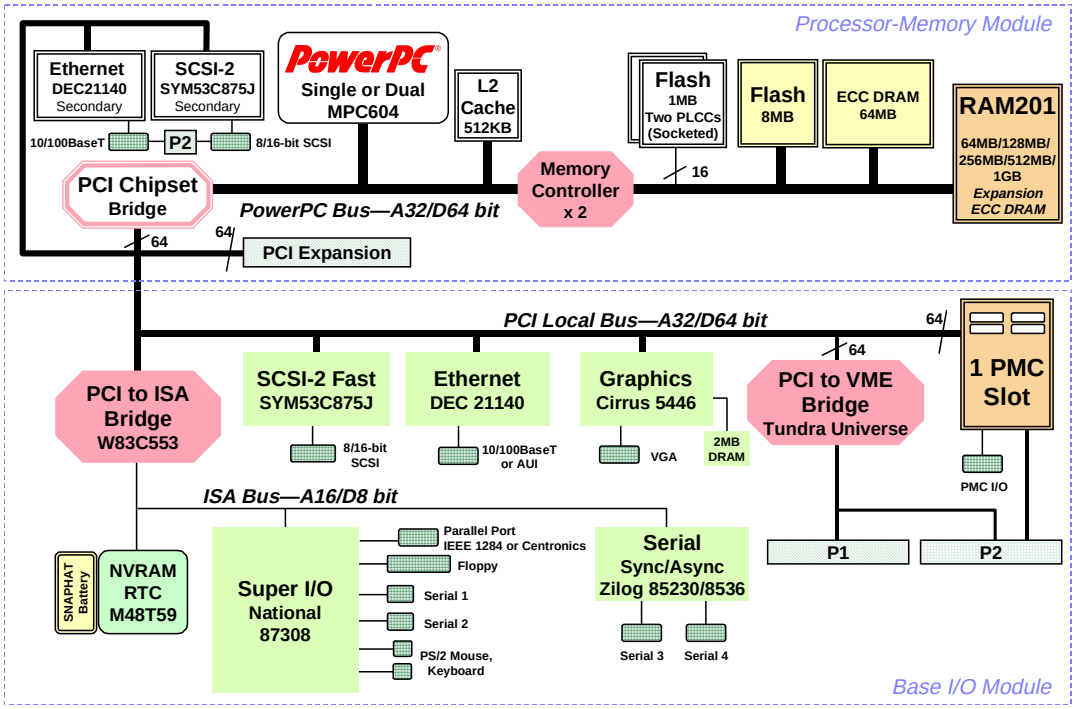


MVME3600/4600 Details

Processor-I/O Mating and PCI Expansion

MVME3600 and MVME4600 processor modules have a 64-bit PCI connection to allow mating with the base I/O module. Design details for the connector and electrical specifications are available from your local Motorola representative. Processor modules also have a separate PCI connector to support PCI expansion carriers such as Motorola PMCspan.

Memory Modules

The MVME3600/4600 series has a modular memory design. 64MB of DRAM are soldered on board the processor-memory module. Additional mezzanine arrays support from 64MB to 1GB of add-on DRAM. These RAM201 expansion modules allow field upgrades of the memory capacity and do not require additional VME slots.

Transition Modules

Two artwork variants of the MVME3600 and MVME4600 are available. One series provides backward compatibility with the MVME712M transition module I/O. The other series accepts the MVME761 transition module that features an additional sync/async serial port, a 10/100BaseT interface, Ultra 16-bit SCSI, and an IEEE 1284 compatible parallel port.

MVME761

The MVME761 transition module provides industry-standard connector access to the IEEE 1284 parallel port, a 10BaseT or 100BaseT port via an RJ-45 connector, two DB-9 connectors providing access to the asynchronous serial ports configured as EIA-574 DTE, and two HD-26 connectors providing access to the sync/async serial ports. These serial ports, labeled as Serial 3 and Serial 4 on the face plate of the MVME761, are individually user configurable as EIA-232, EIA-530, V.35, or X.21 DCE or DTE via the installation of Motorola Serial Interface Modules (SIMs).

A P2 adapter provides interface module signals to the MVME761 transition module. The 3-row P2 adapter can be used for 8-bit SCSI. A 5-row P2 adapter supports 16-bit SCSI and PMC I/O.

MVME712M

The MVME712M transition module provides industry-standard connector access to the Centronics® parallel port, an AUI port, and four DB-25 connectors providing access to the asynchronous/synchronous serial ports jumper configurable as EIA-232 DCE or DTE.

A P2 adapter provides interface signals to the MVME712M transition module. The 3-row P2 adapter can be used for 8-bit SCSI.

To gain access to the additional user definable I/O pins provided via the 5-row VME64 extension connector, a special P2 adapter board is available. This adapter panel replaces the traditional three-row P2 adapter and extends its capability by providing access to the PMC I/O pins.

Several other variations of the MVME712M are available for combinations of I/O and connectors.

Software Support

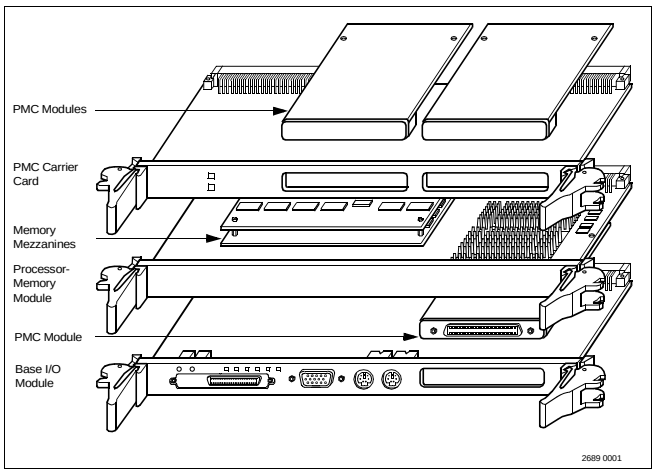
Firmware Monitor

Firmware must fulfill the traditional functions of test and initialization, in addition to operating system boot support. The MVME3600/4600 firmware monitor exceeds these requirements with a proven monitor from the embedded VME leader. It expands features like power-up tests with extensive diagnostics, as well as a powerful evaluation and debug tool for simple checkout or when high-level development debuggers require additional support. All this is included with the MVME3600/4600 firmware, plus it supports booting both operating systems and kernels.

Operating Systems and Real-Time Kernels

The MVME3600 and MVME4600 support a variety of operating systems, including AIX® and a complete range of real-time operating systems and kernels which may be purchased from the following companies:

Motorola Computer Group:	AIX
Integrated Systems, Inc.:	pSOSystem™
Lynx Real-Time Systems, Inc.:	LynxOS™
Microware Systems Corporation:	OS-9®/OS-9000™
Microtec:	VRTX32™
Wind River Systems, Inc.:	VxWorks®



The flexibile, modular design of the MVME3600 and MVME4600 can be quickly and easily customized for a variety of industry-specific applications.

Specifications

Processor-Memory Modules

Processor

Microprocessor:	MPC604	MPC604	MPC604
Clock Frequency:	300 MHz	300 MHz	400 MHz
On-chip Cache (I/D):	32K/32K	32K/32K	32K/32K
Memory Type:	60ns FPM	50ns EDO	TBD
SPECint95, estimated:	8.6	13.1	TBD
SPECfp95, estimated:	8.0	10.6	TBD

Memory

MAIN MEMORY:	Dynamic RAM
Capacity (60ns FPM):	64 or 128MB (300 MHz models only)
Capacity (50ns EDO):	256 or 512MB
Single Cycle Accesses:	9 Read/4 Write
Read Burst Mode (60ns FPM):	9-1-2-1 idle; 3-1-2-1 aligned page hit
Read Burst Mode (50ns EDO):	8-1-1-1 idle; 2-1-1-1 aligned page hit
Write Burst Mode:	4-1-1-1 idle; 3-1-1-1 aligned page hit
Architecture:	128-bit, two-way interleaved
Parity/ECC:	No/Yes
L2 CACHE:	Lookaside, 512KB, 2-1-1-1 access
FLASH:	On-board programmable
Capacity:	1MB via two 32-pin PLCC/CLCC sockets; 4 or 8MB surface mount
Read Access (4MB port):	68 clocks (32 byte burst)
Read Access (1MB port):	260 clocks (8 byte burst)
Write Access (1MB/4MB):	19 clocks (2 bytes/8 bytes)
NVRAM:	8KB (4KB available for users)
Cell Storage Life:	50 years at 55° C
Cell Capacity Life:	10 years at 100% duty cycle
Removable Battery:	Yes

Ethernet—Secondary Interface

Controller:	DEC 21140
Interface speed:	10/100Mb/s
PCI local bus DMA:	Yes, with PCI burst
Connector:	Routed to P2

SCSI—Secondary Interface

Controller:	Symbios 53C875J
PCI local bus DMA:	Yes, with PCI burst
Asynchronous:	5.0MB/s (8-bit mode)
Synchronous:	10.0MB/s (8-bit mode) or 20.0MB/s (16-bit mode)
Connector:	Routed to P2

PCI Expansion Connector

Address/Data:	A32/D32/D64
PCI Bus Clock:	33 MHz
Signaling:	5V
Connector:	114-pin planar connector located between P1 and P2

Board Size

Height:	233.4 mm (9.2 in.)
Depth:	160.0 mm (6.3 in.)
Front Panel Height:	261.8 mm (10.3 in.)
Width:	19.8 mm (0.8 in.)
Max. Component Height:	14.8 mm (0.58 in.)

Base I/O Modules

VMEbus ANSI/VITA 1-1994 VME64 (IEEE STD 1014)

Controller:	Tundra Universe
DTB Master:	A16–A32; D08–D64, BLT
DTB Slave:	A24–A32; D08–D64, BLT, UAT
Arbiter:	RR/PRI
Interrupt Handler/ Generator:	IRQ 1–7/Any one of seven IRQs
System Controller:	Yes, jumperable or auto detect
Location Monitor:	Two, LMA32

Ethernet Interface

	MVME761	MVME712M
Controller	DEC 21140	DEC 21140
Interface Speed:	10/100Mb/s	AUI (10Mb/s)
PCI Local bus DMA:	Yes, with PCI burst	Yes, with PCI burst
Connector:	Routed to P2, RJ-45 on MVME761	Routed to P2, DB-15 AUI on MVME712M

SCSI Interface

	MVME761	MVME712M
Controller:	Symbios 53C875J	Symbios 53C875J
PCI Local Bus DMA:	Yes, with PCI local bus burst	Yes, with PCI local bus burst
Asynchronous:	5.0MB/s (8-bit mode)	5.0MB/s (8-bit mode)
Synchronous:	10.0MB/s (8-bit mode), 20.0MB/s (16-bit mode)	10.0MB/s (8-bit mode), 20.0MB/s (16-bit mode)
Connector:	Routed to P2, 50- or 68-pin on P2 adapter	Routed to P2, SCSI D-50 on MVME712M

Graphics Interface

Controller:	Cirrus 5446
Resolution (non-interlaced, 2MB of video memory):	800 x 600 x 16M colors, 75 Hz vertical 1024 x 768 x 65K colors, 75 Hz vertical 1280 x 1024 x 256 colors, 75 Hz vertical
Video memory:	DRAM, 2MB on-board 70ns, 64-bit width
Connectors:	15-pin D, Super VGA standard; on front panel

Asynchronous Serial Ports

	MVME761	MVME712M
Controller	PC87308	PC87308, 85230/ 8536
Number of Ports:	Two, 16550 compatible	Three, two 16550 compatible and one 85230/8536
Configuration:	EIA-574 DTE	EIA-232 DCE/DTE
Async Baud Rate, bps max.:	38.4K EIA-232, 115Kbps raw	38.4K EIA-232, 115Kbps raw
Connector:	Routed to P2, DB-9 on MVME761	Routed to P2, DB-25 on MVME712M

Synchronous Serial Ports

	MVME761	MVME712M
Controller	85230/8536	85230/8536
Number of Ports:	Two	One
Configuration:	TTL to P2 (both ports), SIM on MVME761	EIA-232 DCE/DTE
Baud Rate, bps max.:	2.5M sync, 38.4K async	2.5M sync, 38.4K async
Oscillator Clock Rate (PCLK):	10 MHz/5 MHz	10 MHz/5 MHz
Connector:	Routed to P2, HD-26 on MVME761	Routed to P2, DB-25 on MVME712M

Parallel Port

	MVME761	MVME712M
Controller	PC87308	PC87308
Configuration:	8-bit bidirectional, full IEEE 1284 support; Centronics compatible	8-bit bidirectional, IEEE 1284 minus EPP and ECP
Modes:	Master only	Master only
Connector:	Routed to P2, HD-36 on MVME761	Routed to P2, D-36 on MVME712M

Counters/Timers

TOD Clock Device:	M48T59; 8KB NVRAM
Real-Time Timers/ Counters:	Four, 32-bit programmable
Watchdog Timer:	Time-out generates reset

Floppy

Controller:	PC87308
Compatible Controllers:	DP8473, 765A, N82077
Configuration:	3.5" 2.88MB and 1.44MB; 5.25" 1.2MB
Connector:	HD-50 on front panel

Mouse Interface

Controller:	PC87308
Connector:	6-pin circular female mini DIN on front panel

Keyboard Interface

Controller:	PC87308
Connector:	6-pin circular female mini DIN on front panel

IEEE P1386.1 PCI Mezzanine Card Slot

Address/Data: A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors

PCI Bus Clock: 33 MHz

Signaling: 5V

Power: +3.3V, +5V, ±12V; 7.5 watts maximum per PMC slot

Module Types: Basic, single-wide, front panel I/O or P2 I/O (Note: P2 I/O is only accessible to systems equipped for VME64 extension connectors.)

Board Size

Height: 233.4 mm (9.2 in.)

Depth: 160.0 mm (6.3 in.)

Front Panel Height: 261.8 mm (10.3 in.)

Width: 19.8 mm (0.8 in.)

Max. Component Height: 14.8 mm (0.58 in.)

Miscellaneous

Reset and abort switches on front panel; six LEDs for FAIL, CHKSTP, CPU, PCI, SCON, and FUSE

Transition Modules

I/O Connectors

	MVME761	MVME712M
Asynchronous Serial Ports:	Two, DB-9 labeled as COM1 and COM2	Three, DB-25 labeled as Serial 1, Serial 2, and Serial 3
Synchronous Serial Ports:	Two HD-26 labeled as Serial 3 and Serial 4 (user configurable via installation of SIMs), Four 60-pin connectors on MVME761 planar for installation of two SIMs	One, DB-25 labeled as Serial 4
Parallel Port:	HD-36, Centronics compatible	D-36, Centronics compatible
Ethernet:	10BaseT or 100BaseTX RJ-45	10Mb/s Ethernet DB-15 AUI
SCSI:	8- or 16-bit, 50- or 68-pin connector via P2 adapter	8-bit, standard SCSI D-50

Board Size

Height: 233.4 mm (9.2 in.)

Depth: 80.0 mm (3.1 in.)

Front Panel Height: 261.8 mm (10.3 in.)

Width: 19.8 mm (0.8 in.)

All Modules

Power Requirements

(not including power required by PMC or external AUI transceiver)

	+5V ± 5%	+12V ± 10%	–12V ± 10%
MVME3604-6342:	8.5 A typ. 10.5 A max.	250 mA typ. 500 mA max.	100 mA typ. 250 mA max.
MVME3604-5442:	6.37 A typ. 10.25 A max.	250 mA typ. 500 mA max.	100 mA typ. 250 mA max.
MVME4604-5442:	8.42 A typ. 13.65 A max.	250 mA typ. 500 mA max.	100 mA typ. 250 mA max.

Demonstrated MTBF

(based on a sample of eight boards in an accelerated stress environment)

Mean: 190,509 hours

95% Confidence: 107,681 hours

Environmental

	Operating	Nonoperating
Temperature:	0° C to +55° C, forced air cooling	–40° C to +85° C
Altitude:	5,000 m	15,000 m
Humidity (NC):	5% to 90%	—
Vibration:	2 Gs RMS, 20–2000 Hz random	6 Gs RMS, 20–2000 Hz random

Electromagnetic Compatibility (EMC)

Intended for use in systems meeting the following regulations:

U.S.: FCC Part 15, Subpart B, Class A (nonresidential)

Canada: ICES-003, Class A (nonresidential)

This product was tested in a representative system to the following standards:

CE Mark per European EMC Directive 89/336/EEC with Amendments; Emissions: EN55022 Class B; Immunity: EN50082-1

Safety

All printed wiring boards (PWBs) are manufactured with a flammability rating of 94V-0 by UL recognized manufacturers.

Ordering Information

Part Number	Description
Processor-Memory and I/O Base Modules	
All processor-memory modules include 64–512MB ECC DRAM, 9MB Flash, and 512KB L2 cache	
MVME3604-5342A to MVME3604-5372	300 MHz MPC604, IEEE 1101 front panel; for use with MVME761
MVME3604-6342 to MVME3604-6372	300 MHz MPC604, Scanbe front panel; for use with MVME712M
MVME3604-5442, 5462, 5472	400 MHz MPC604, IEEE 1101 front panel; for use with MVME761
MVME3604-6442, 6462, 6472	400 MHz MPC604, Scanbe front panel; for use with MVME712M
MVME4604-5342A to MVME4604-5372	Dual 300 MHz MPC604, IEEE 1101 front panel; for use with MVME761
MVME4604-6342 to MVME4604-6372A	Dual 300 MHz MPC604, Scanbe front panel; for use with MVME712M
MVME4604-5442, 5462, 5472	Dual 400 MHz MPC604, IEEE 1101 front panel; for use with MVME761
Transition Modules	
MVME712M	Transition module: One DB-25 sync/async serial port connector, three DB-25 async port connectors, one AUI connector for Ethernet, one D-36 parallel port connector, and a 50-pin 8-bit SCSI connector; includes 3-row DIN P2 adapter module and cable
MVME761P2-011	5-row DIN P2 adapter compatible with MVME712M; connectors for 16-bit (wide) SCSI and PMC I/O; requires backplane with 5-row DIN connectors
MVME761-001	Transition module: Two DB-9 async serial port connectors, two HD-26 sync/async serial port connectors, one HD-36 parallel port connector, one RJ-45 10/100 Ethernet connector; includes 3-row DIN P2 adapter module and cable
MVME761-011	Transition module: Two DB-9 async serial port connectors, two HD-26 sync/async serial port connectors, one HD-36 parallel port connector, one RJ-45 10/100 Ethernet connector; includes 5-row DIN P2 adapter module and cable; requires backplane with 5-row DIN connectors
SIM232DCE or DTE	EIA-232 DCE or DTE Serial Interface Module
SIM530DCE or DTE	EIA-530 DCE or DTE Serial Interface Module
SIMV35DCE or DTE	V.35 DCE or DTE Module

Related Products	
RAM201-004	64MB expansion ECC DRAM mezzanine, nonstackable (300 MHz models only)
RAM201-005	128MB expansion ECC DRAM mezzanine, nonstackable (300 MHz models only)
RAM201-006	256MB expansion ECC DRAM mezzanine, nonstackable
RAM201-007	512MB expansion ECC DRAM mezzanine, nonstackable
RAM201-107	512MB expansion ECC DRAM mezzanine, stackable with RAM201-006 and -007 only
PMCSPAN-001	Primary 32-bit PCI expansion, mates directly to the processor-memory module providing slots for either two single-wide or one double-wide PMC card; accepts optional PMCSPAN-010
PMCSPAN-010	Secondary 32-bit PCI expansion, plugs directly into PMCSPAN-001 providing two additional PMC slots
PMCSPAN1-001:	PMCSPAN-001 with original VME Scanbe front panel and handles
PMCSPAN1-010:	PMCSPAN-010 with original VME Scanbe front panel and handles
Documentation	
V36V46A/IH	MVME3600 and MVME4600 Installation and Use Manual
V36V46A/PG	MVME3600 and MVME4600 Programmer's Reference Guide
VME712MA/IH	MVME712M Transition Module Installation and Use
VME761A/IH	MVME761 Transition Module Installation and Use
PPCBUGA1/UM, PPCBUGA2/UM	PPCBug Firmware Package User's Manual, parts 1 and 2
PPCDIAA/UM	PPCBug Diagnostics Manual

Notes

1. Major revision levels are indicated by alpha character at end of part number.
2. Board support package source and object modules available upon request.
3. Documentation is available for on-line viewing and ordering at http://www.motorola.com/computer/literature.

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